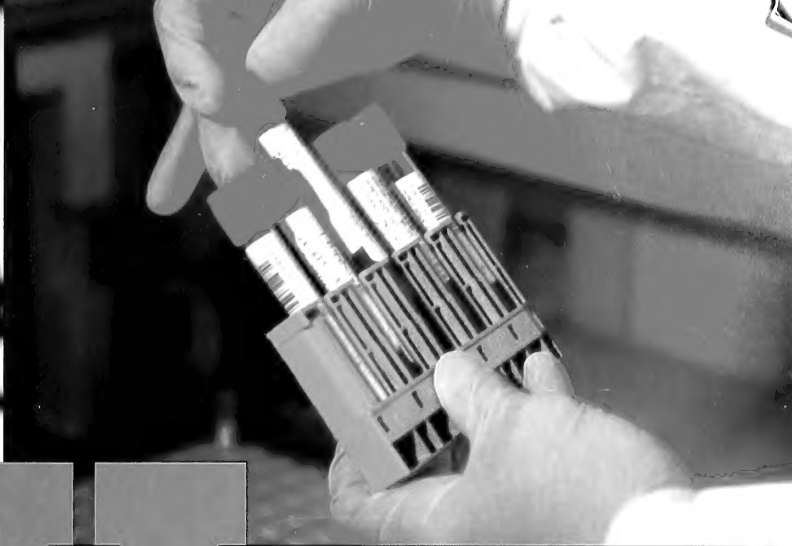


RESOURCE  
INITIATIVE



# HIV Prevention Saves Lives



4594

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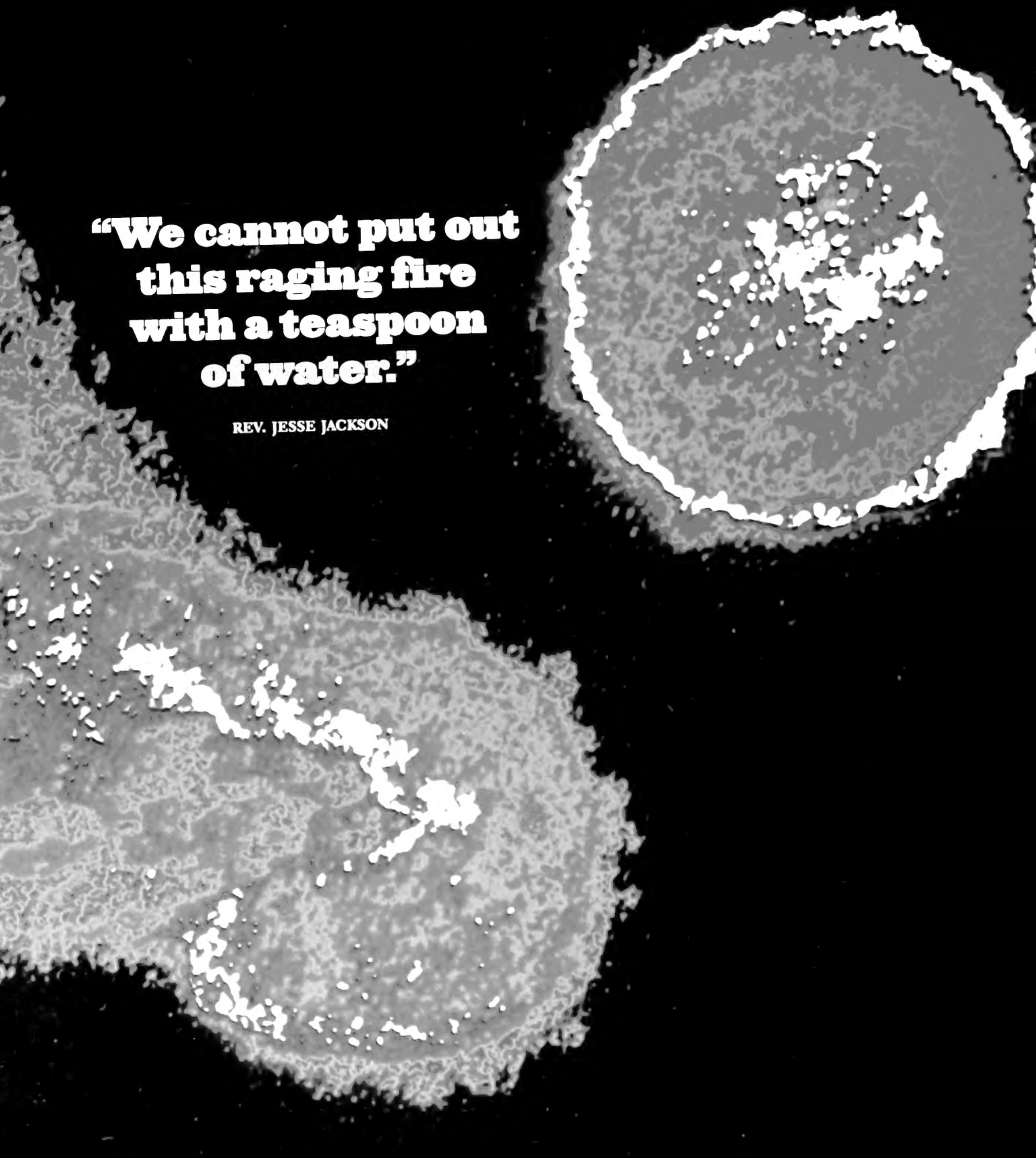


Centers for Disease Control and Prevention  
National Center for HIV, STD, and TB Prevention

MH01D4594

**"We cannot put out  
this raging fire  
with a teaspoon  
of water."**

REV. JESSE JACKSON



# Does HIV prevention work?

## As we enter the third decade of the AIDS epidemic, the answer to that question is clear.

Overwhelming evidence—including extensive historical experience and scores of careful scientific studies—demonstrates that well designed and delivered HIV prevention programs contribute to healthier behaviors and substantially reduce the number of new HIV infections.

Numerous opinion surveys reveal broad—and continuing—public support for a broad range of prevention programs—from federal funding for community-based programs, to AIDS education in our schools, to condom promotion messages on the airwaves. In a 1999 Harris poll, more than 90% of Americans surveyed said fighting AIDS was “very important.” A national poll by the Henry J. Kaiser Family Foundation in 1997 found strong public support for HIV prevention programs. Additionally, separate Kaiser surveys found especially strong support among African Americans and Hispanics, who have been disproportionately affected by HIV.

If anything, preventing HIV has become more difficult in recent years—but remains critical. Medical advances in the treatment of HIV have, thankfully, added years to the lives of individuals being treated for HIV infection. Unfortunately, though, this progress has led to a dangerous climate of complacency. Although HIV remains a serious and lifelong infection, and AIDS is still very much a life-threatening disease, a growing number of people appear to be relying too much on treatment advances, ignoring prevention messages, and returning to high-risk behavior. Each new generation needs to be reminded of the still-serious nature of HIV and the importance of prevention.

Following the HIV prevention successes in the white gay community in the 1980s, new populations experienced dramatic increases in infections. The epidemic has expanded from one primarily affecting whites to one in which a majority of those affected are in communities of color. An epidemic originally affecting two principal populations—gay men and injection drug users—has diversified into one in which heterosexual acquisition of the virus, especially for women, is occurring more frequently. A new generation of gay men has replaced the men who benefited from early prevention strategies, and gay men of color with AIDS have

## HIV/AIDS TODAY

**HIV Infections:** Between 800,000 and 900,000 people are living with HIV in the U.S. Each year, at least 40,000 Americans are estimated to contract the virus—a rate that has remained roughly stable since about 1992. Half of all new infections are believed to occur in people below age 25.

**African Americans:** African Americans are estimated to account for over half of all new HIV infections. African Americans are nearly 10 times more likely than whites to be diagnosed with AIDS.

**Latinos:** Latinos are also disproportionately affected. Latinos are estimated to account for 20% of new HIV infections and AIDS cases, and are nearly four times more likely than whites to be diagnosed with AIDS.

**Women:** The percentage of HIV and AIDS cases diagnosed in women continues to climb. Currently, women are estimated to account for 30% of all new HIV infections.

**Gay and Bisexual Men:** Men who have sex with men (MSM) still represent the population with the single largest share of new and existing HIV infections. They are estimated to account for more than 40% of all new infections, and approximately 60% of new infections among men. While white MSM continue to account for more than one in four AIDS diagnoses among men, in 1998, the number of MSM of color diagnosed with AIDS surpassed, for the first time, the number of white MSM AIDS cases.

**Heterosexuals:** Heterosexual exposure accounts for a growing share of new infections—about one in three—and accounts for 75% of new HIV infections among women.

**Injection Drug Users:** Injection drug users make up an estimated 25% of all new infections. Injection drug use contributes to the epidemic's spread far beyond the circle of those who inject. People who have sex with an injection drug user also are at risk for infection through sexual HIV transmission. And, children born to mothers who contracted HIV through injecting drugs or having sex with an injection drug user, may become infected as well.

**Geographic Distribution:** Confined in its early years to a few urban areas, the HIV epidemic has since spread throughout the country, affecting small towns and rural areas, often less able to access HIV prevention services, as well as major metropolitan areas. 7% of AIDS cases are occurring in small towns with populations of less than 50,000.

surpassed the number of white gay men with the disease. Finally, the epidemic is becoming decidedly younger.

There are more people living with HIV and AIDS today than at any point in the epidemic's history. While the national bill for treatment and lost productivity associated with HIV/AIDS continues to escalate, funding for HIV prevention services has remained relatively flat since 1991, barely keeping pace with the rate of inflation. As a result, prevention programs have fewer and fewer resources with which to confront an increasingly diverse and complex epidemic.

This report aims to refocus public attention on what remains a critical public health imperative—the ongoing need to prevent the spread of HIV. As the federal agency leading HIV prevention efforts, the Centers for Disease Control and Prevention (CDC) has summarized its approach to HIV prevention, outlined the most pressing challenges, and described the historical and scientific evidence of the effectiveness of HIV prevention. Finally, in this report, CDC highlights goals for the future of HIV prevention in the United States.

As the information in this report demonstrates, we need HIV prevention now more than ever.

# **CDC'S APPROACH TO HIV**

**The Centers for Disease Control and Prevention (CDC) works to promote health and the quality of life by preventing and controlling disease, injury and disability, and is the lead federal agency for HIV prevention.**

## **CORE PRINCIPLES**

CDC's approach to HIV prevention relies on several core principles. These principles arise out of CDC's experience in the HIV prevention field, the substantial body of HIV prevention science research, and sound public health practice.

### **Partnership**

CDC could not achieve its public health goals without the active collaboration of individuals and organizations at the local, state, and national level. Governmental and non-governmental partnerships are a critical element of all of CDC's policies and programs.

### **Sound Scientific Evidence**

CDC conducts prevention science research that helps health care workers, program planners and other prevention specialists better understand the biomedical, behavioral and societal factors that contribute to HIV transmission. This research also helps identify interventions that are proven to change these behaviors.

### **Carefully Targeted Programs**

Broad HIV prevention efforts, such as information campaigns, are important for educating the overall population about the risk of HIV infection and ways to protect themselves. However, prevention programs designed to reach the "general population" are not the most effective way to influence behavior change among those most at risk for HIV infection. Scarce HIV prevention funds are most effectively spent when they are carefully targeted to meet the needs of those at greatest risk.

### **Cultural Relevance**

To produce lasting behavior change, prevention programs must speak

the language of the target community and take into account the social and cultural realities of people at greatest risk of infection.

### **Tailored to Local Needs**

Although HIV/AIDS in the United States is often referred to as a single epidemic, it is, in truth, composed of numerous smaller epidemics that often differ substantially from one another. CDC's community planning process—which is designed to involve local community members in every level of decision-making—provides communities with the resources and tools they need to tailor their HIV prevention programs to meet local needs.

### **More than Education**

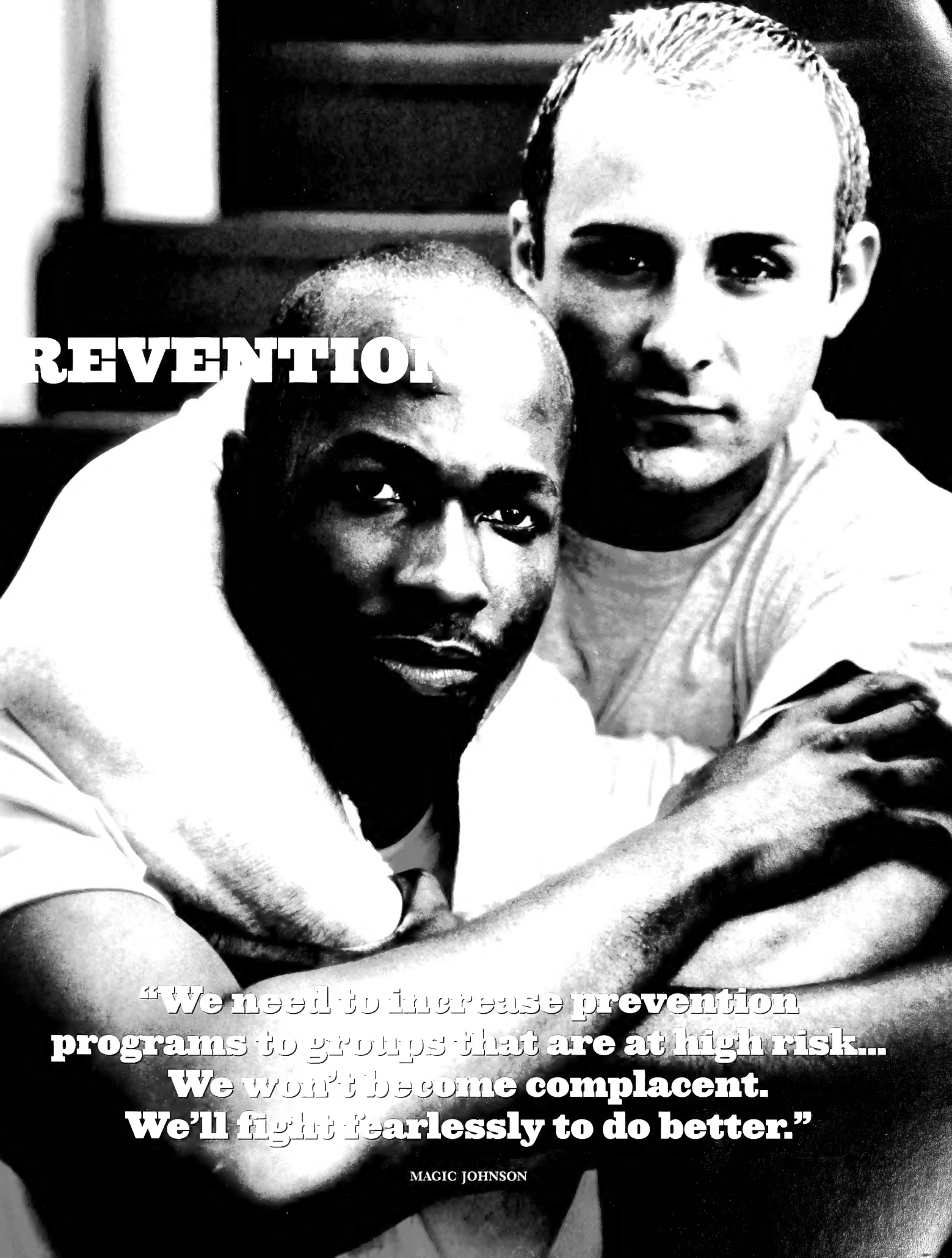
Overwhelming scientific evidence demonstrates that information alone does not lead to long-term behavior change. In addition to providing information, effective prevention programs must be sustained over time, be interactive, and actively address participants' skills and motivations to change unhealthy behaviors.

### **Confidentiality**

Like all Americans, people at risk for HIV infection value the privacy and confidentiality of their personal information. Confidentiality is a core principle of all of CDC's HIV prevention and surveillance programs.

### **Combat Discrimination and Stigma**

The stigma associated with HIV—and with the behaviors that transmit HIV—hinders behavior change efforts because it encourages prejudice and discrimination, stifles open discussions of risk behaviors, and drives people at risk away from needed prevention and care services. Prevention efforts recognize and work to overcome the stigma of HIV and AIDS.



**PREVENTION**

**"We need to increase prevention  
programs to groups that are at high risk...  
We won't become complacent.  
We'll fight fearlessly to do better."**

MAGIC JOHNSON

# Programs for those who

## **Programs for Those Who Are HIV Positive and HIV Negative**

With the advent of new drugs that prolong the lives of individuals with HIV, there are more people in the U.S. who are living with HIV infection than ever before. As a result, it has become increasingly important to expand HIV prevention programs to include HIV-positive people and their current and future partners. CDC's Serostatus Approach to Fighting the HIV/AIDS Epidemic (SAFE) aims to promote HIV prevention programs that are specifically tailored to meet the needs of individuals infected with HIV as well as high-risk individuals who are not infected.

**Guided by these principles, CDC works on three fronts—helping communities; researching prevention; and tracking HIV/AIDS.**

### **HELPING COMMUNITIES**

CDC provides local communities with extensive financial support and technical guidance to implement effective strategies to prevent HIV transmission.

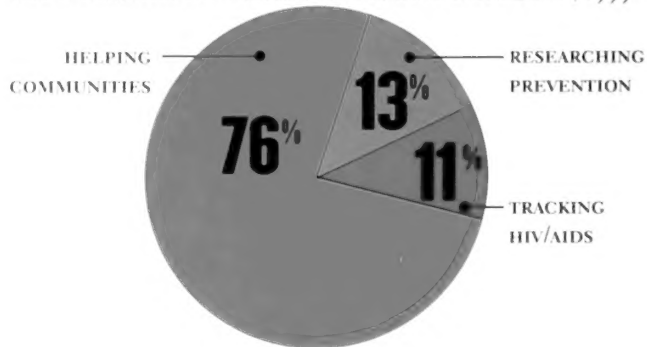
Each year, CDC delivers more than \$450 million in financial support for HIV prevention activities to 65 state, territorial and local health departments, multiple national and regional minority organizations, and more than 100 local community-based organizations. Altogether, this assistance accounts for 76% of CDC's spending on HIV prevention for high-risk communities.

In 1997, CDC revised the way funds were distributed from health departments, adopting "community planning" to improve the effectiveness of its prevention funding to local communities. Under this approach, special committees, including health department and community representatives, collaborate to determine local priorities for HIV prevention based on data on the local epidemic, existing community resources, and science on the most effective prevention interventions.

In addition to community-based prevention programs, CDC's grants to health departments also support the public HIV counseling and testing programs that serve as a gateway to HIV prevention and treatment for both at-risk and infected individuals.

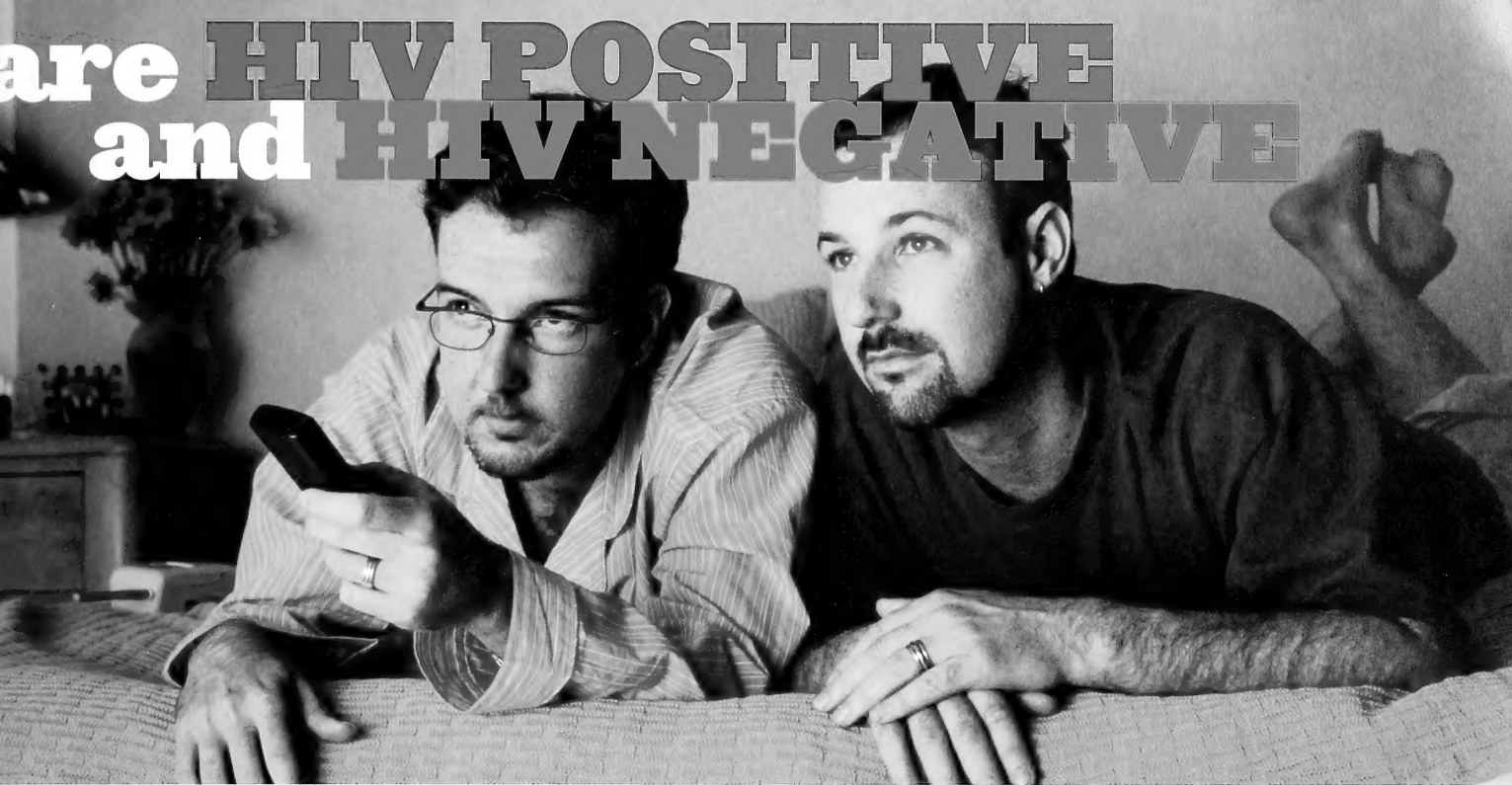
CDC also funds and provides technical assistance to state and city education departments throughout the country to help them provide HIV prevention education for young people.

CDC'S TARGETED HIV PREVENTION FUNDING BREAKDOWN, 1999\*



This graph examines the breakdown of CDC's prevention activities for high-risk populations, which accounts for almost 95% of CDC's overall HIV prevention budget. Not included here are international efforts, which account for 2% of the overall budget, and education efforts for the general population, which account for 3% of the overall budget.

# are HIV POSITIVE and HIV NEGATIVE



## RESEARCHING PREVENTION

To ensure that CDC-funded organizations nationwide are using the most effective prevention strategies, CDC undertakes both biomedical and behavioral research. HIV-related research accounts for 13% of CDC's HIV prevention budget for high-risk populations—approximately \$82 million in 1999.

CDC's research focuses on evaluating biomedical approaches to preventing HIV transmission. Effective risk reduction strategies, combined with new treatments for HIV and other sexually transmitted diseases, offer more hope than ever for reducing the spread of HIV. CDC researches potential new prevention technologies such as vaccines, microbicides, new testing methods for HIV, and enhancing measures to prevent mother-to-child transmission.

In the behavioral field, CDC's research focuses on identifying the factors that influence risky behavior and transmission in different communities, and evaluating various approaches to reducing risk. For example, CDC researchers have recently examined the important role parental communication can play in reducing risk behavior among young African-American and Latino youth. Research has also focused on developing and evaluating new approaches to counseling and testing for women at high risk. Other behavioral research initiatives include examining the effectiveness of peer interventions for gay men, street outreach for injection drug users, community-level interventions for young Latino men who have sex with men, HIV education for youth (both in and out of school), and faith-based programs in African-American communities. CDC works with national and local partners to ensure that biomedical and behavioral research findings are translated into effective community-based programs.

## TRACKING HIV/AIDS

CDC's HIV/AIDS surveillance system is the nation's source for key information on the AIDS epidemic. CDC has tracked AIDS statistics since 1981, since the very first reports of what was then an unknown disease.

Prior to the advent of powerful new drugs to treat HIV infection, HIV progressed to AIDS at predictable intervals, allowing public health officials to identify populations most at risk with some degree of accuracy. Since 1996, however, many HIV-infected people have begun combination drug therapy, delaying or stopping the progression from HIV to AIDS. This means that HIV, not AIDS cases, is the more accurate gauge of the epidemic's leading edge.

CDC recently recommended that all states begin reporting cases of HIV, in addition to AIDS. To date, 33 states and one territory have extended their AIDS surveillance to include HIV infection. CDC also conducts supplemental studies to get a clearer picture of where, how many, and why new infections are occurring. These studies include snapshots of the number of existing and new infections in populations at high risk, and analyses of risk behaviors, HIV testing patterns, and attitudes in groups of recently infected individuals.

These data on HIV and AIDS, by race, gender and mode of transmission, have been one of the most potent weapons enabling public health agencies to target the populations most in need of HIV prevention programs. The principals of quality and confidentiality are integral to all of CDC's surveillance efforts.

# COUNTLESS **Infections** PREVENTED

Throughout much of the 1980s, more than 100,000 individuals in the United States became infected with HIV annually.

After substantial increases in funding for HIV prevention programs in the 1980s, the annual incidence of HIV infection in the U.S. dropped sharply. By the early 1990s, the annual rate of new infections had declined to 40,000—where it has remained.

Prevention programs helped to significantly slow the overall U.S. epidemic, and during the last decade, overall increases in infection have been avoided. Populations of gay men and injection drug users, who have been exposed to HIV prevention measures the longest, provide the strongest proof of the effectiveness of HIV prevention. Yet, in order to maintain progress, and reduce infections further, successful programs must be sustained, and lessons learned must be extended to new populations at risk.

## **GAY MEN**

In the United States, HIV and AIDS first struck the gay population. By the mid-1980s, epidemiologic surveys suggested that in some major urban gay communities, close to 50% of gay men were infected.<sup>1</sup>

Prevention programs implemented in various gay communities across the U.S. helped gay men change sexual behaviors that increase their risk for HIV infection and other STDs. Following initiation of culturally relevant safer sex programs, studies indicated that gay men, on average, sharply reduced high-risk behaviors.<sup>2</sup> Dramatic declines in HIV infection rates accompanied initiation of these HIV prevention programs in the gay population.<sup>3</sup>

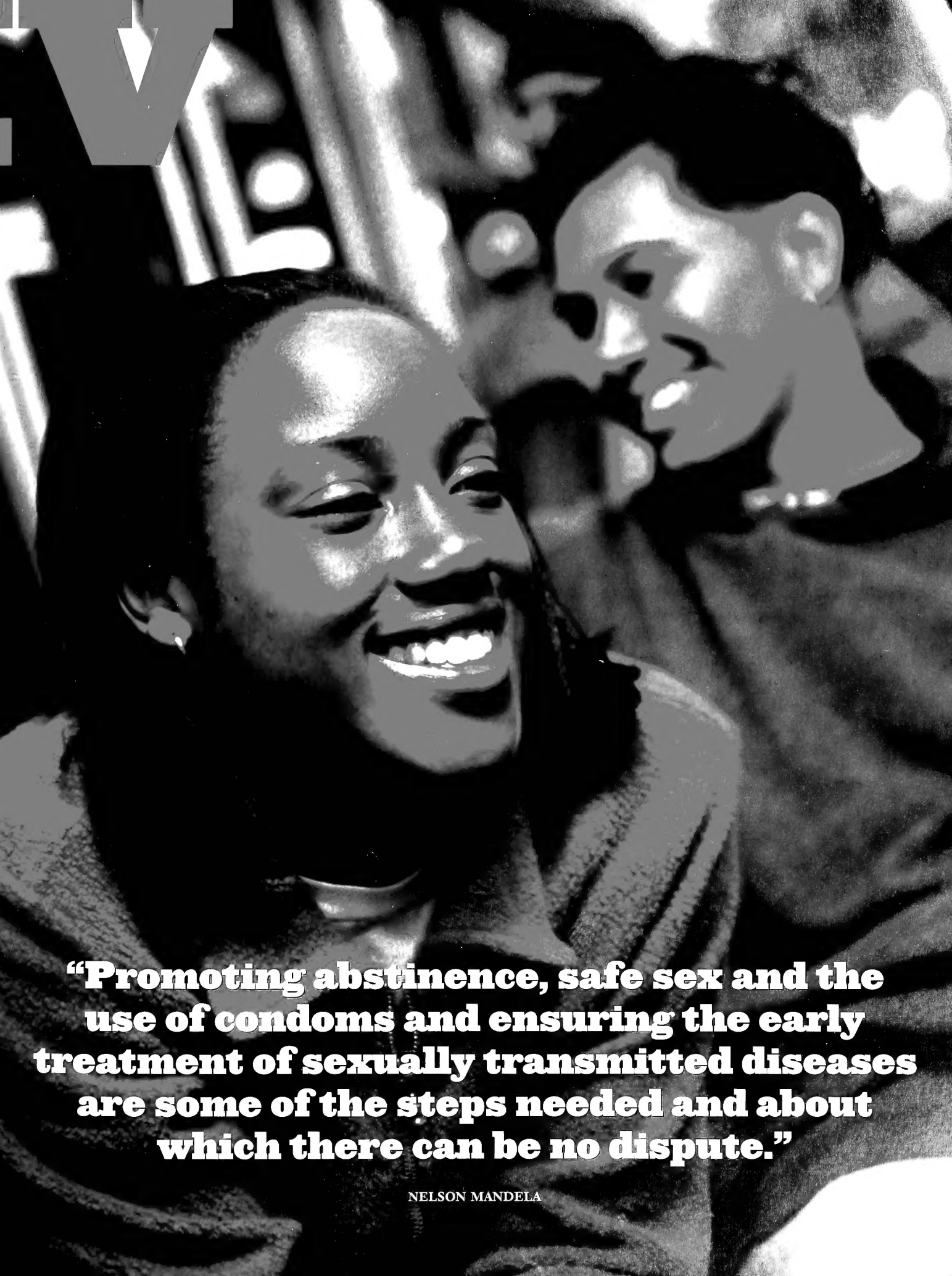
Incidence studies in major metropolitan areas suggest that infection rates today are substantially lower than they were 10 years ago. For example, rapid declines were seen in young gay men in San Francisco where HIV incidence dropped from nearly 20% in the mid-1980s to less than 2% by 1987. Similar declines occurred in other cities, including Baltimore, Chicago, Los Angeles and Washington D.C., with incidence levels of between 6% and 12% in 1984 dropping to less than 4% in 1989.

## **INJECTION DRUG USERS**

When HIV infection exploded among injection drug users in the 1980s, some questioned whether there was any way to bring the epidemic under control. A collaborative effort between governmental and non-governmental partners to develop a range of prevention interventions for injection drug users (IDUs)—including drug treatment, needle exchange, peer support, street outreach, and counseling—proved otherwise.

Studies have documented substantial reductions in rates of needle sharing and use of nonsterile injection equipment.<sup>4</sup> Others have demonstrated substantial positive effects from the linkage of HIV prevention with drug treatment.<sup>5</sup>

In 1998, leading epidemiologists reported that HIV infection rates among New York City's IDUs had declined by more than 40% during the 1990s.<sup>6</sup> More recently, the New York State Department of Health found that HIV prevalence among first-time testers in drug treatment programs dropped from 33.6% in 1990 to 4.3% in 1998—an eight-fold decline in the rate of infection.<sup>7</sup>



**“Promoting abstinence, safe sex and the use of condoms and ensuring the early treatment of sexually transmitted diseases are some of the steps needed and about which there can be no dispute.”**

NELSON MANDELA

# PROVEN HIV Prevention Strategies

Could the dramatic declines in HIV infection rates be attributable to something other than HIV prevention strategies? Certainly, many epidemiologic and social variables contribute to overall trends in infection. However, there is compelling evidence that prevention programs have played a significant role in controlling the U.S. HIV epidemic.

Controlled scientific studies conclusively demonstrate the efficacy of HIV prevention programs in a wide range of populations. Summarized below are the results of rigorous evaluations of interventions targeting specific populations:

## PEOPLE OF COLOR

Consistent with the growing HIV burden in communities of color, much research has focused on strategies to reduce risk behaviors in these communities. Prevention programs have been found to be effective in subgroups at increased risk within communities of color, such as gay men, injection drug users, and women—as detailed in the following sections. In general:

- African Americans and Latinos composed the majority of research participants in the interventions for men.
- In two of the successful interventions for women, African Americans and Latinas made up all of the trial participants.<sup>7</sup>
- In the young people section, “Be Proud! Be Responsible!”—a program proven to be successful at increasing condom use and reducing the number of new sex partners—was expressly designed for African-American youth.<sup>8</sup>
- More than 80% of participants in the STD clinic-based intervention for heterosexual adults were African American or Latino.<sup>10</sup>

- People of color represented more than three-quarters of participants in research on a groundbreaking testing-based counseling intervention.<sup>11</sup>

## YOUNG PEOPLE

Prevention science research has identified numerous interventions that help young people adopt healthier behaviors. Importantly, given that many young people at risk for HIV are not in school, research has demonstrated the efficacy of both school-based and out-of-school prevention programs.

Princeton University researchers found that participants in “Be Proud! Be Responsible!”—a five-hour interactive intervention for African-American youth in Philadelphia—reported fewer sex partners and more frequent condom use than young people who were not exposed to the intervention.<sup>12</sup>

“Adolescents Living Safely, Awareness, Attitudes & Actions” is a multiple-session program that seeks to improve homeless youth’s HIV-related knowledge, skills, attitudes and access to resources. The intervention has been proven to result in a substantial increase in consistent condom use and a reduction in high-risk sex among sexually active street youth. Researchers found no evidence that the intervention encourages young people who are not sexually active to have sex.<sup>13</sup>

In 1999, researchers reported that an educational program for HIV-positive youth resulted in a 78% increase in consistent condom use among participants. More than 40% of participants reported fewer sex partners, and nearly one in three reported decreased substance abuse.<sup>14</sup>



## GAY MEN

As early as 1989, CDC researchers reported that an intervention that improved people's ability to negotiate and communicate about safer sex more than doubled condom use among gay participants.<sup>15</sup>

This important finding was followed in the 1990s by reports that programs built around popular individuals in gay social networks could increase condom use in these networks by 20-70%.<sup>16</sup> In this intervention, researchers recruited bartenders at gay clubs to nominate popular gay "opinion leaders," who were then enlisted to become trained HIV prevention educators.

Although much of the earliest HIV-related research focused on white gay men, subsequent studies have demonstrated the efficacy of interventions targeted to gay and bisexual men of color. University of California researchers reported that a series of three 3-hour workshops for African-American gay and bisexual men reduced reported instances of unprotected anal intercourse by more than 50%.<sup>17</sup>

The Center for AIDS Prevention Studies developed and tested the "MPOWERment Project," a multi-component intervention for young gay men that consisted of outreach, peer-led small groups, and a small publicity campaign. Evaluation of the project determined that participants reduced self-reported unprotected anal intercourse by 27%.<sup>18</sup>

Currently, CDC is supporting research in five cities to develop a community-level intervention to reduce transmission among young Latino men who have sex with men.

## INJECTION DRUG USERS

Preventing the spread of HIV through injection drug use requires a wide range of approaches, including programs to prevent initiation of drug use, provide high-quality substance abuse treatment options to drug users, educate those at risk about prevention, and provide access

to sterile needles and syringes for those who are unwilling or unable to stop injecting. Many interventions have proven effective at promoting safer behaviors among IDUs:

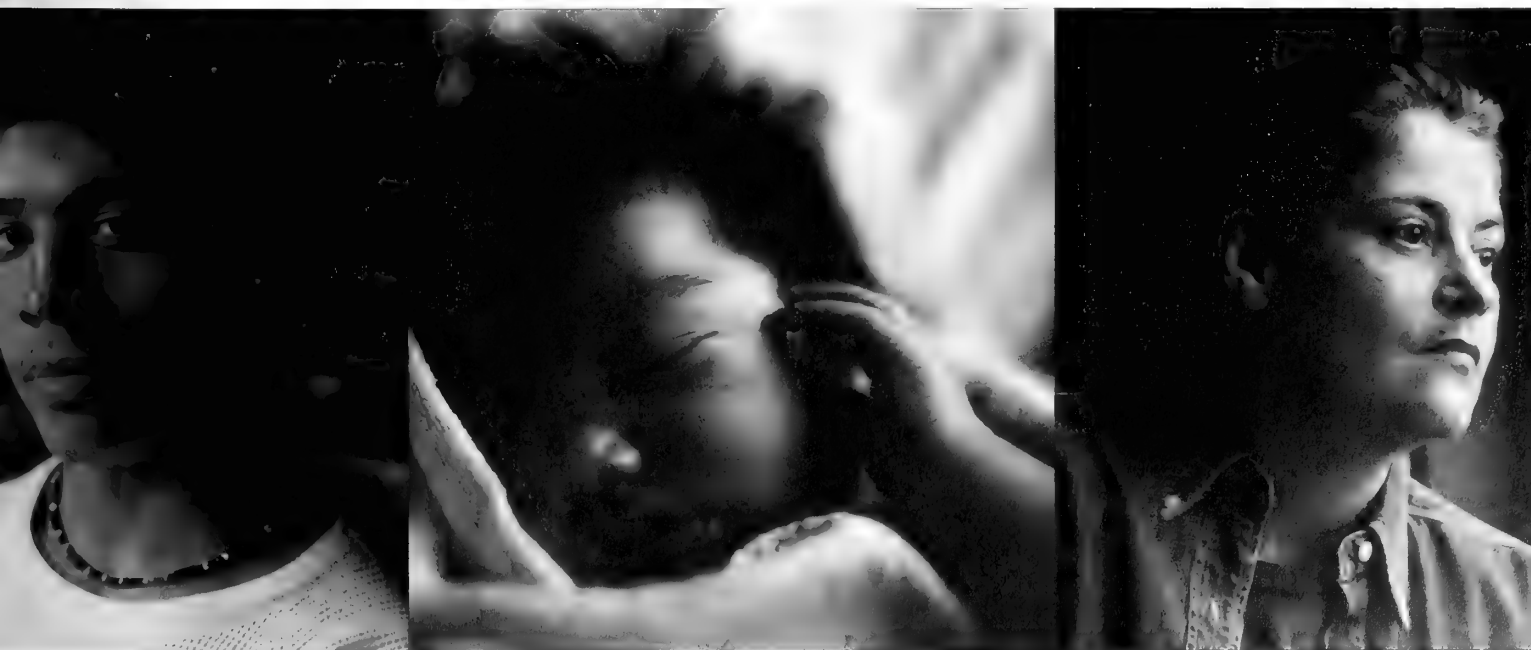
Substance abuse treatment is effective HIV prevention. Effective treatment that helps people stop using drugs not only eliminates the risk of HIV transmission from sharing contaminated syringes, but for many it also reduces the risk of engaging in risky behaviors that might result in sexual transmission.<sup>19</sup>

Lack of drug treatment slots, however, seriously complicates prevention efforts. Indeed, the need for substance abuse treatment vastly outstrips the programs our nation funds. While there are more than a million IDUs in the U.S., and many others who use non-injection drugs, substantially fewer slots are available at any given time.

For individuals who cannot or will not stop using drugs, behavior change programs have proven effective in reducing their risk of acquiring and spreading HIV infection through drug-related or sexual risk behaviors. According to researchers, HIV testing, combined with individual and group counseling, leads to a significant increase in safer needle practices.<sup>20</sup> Similarly, research has demonstrated that behavior change programs built into drug detoxification and methadone maintenance programs encourage IDUs to reduce HIV-related risk behaviors.<sup>21</sup> In addition, several studies have demonstrated that street outreach, coupled with counseling and testing, help out-of-treatment IDUs reduce the frequency of risky drug- and sex-related behaviors.<sup>22</sup>

The CDC-supported AIDS Community Demonstration Projects—which enable IDUs to learn from each other about successful risk-reduction strategies—also lead to significant increases in condom use among participants.<sup>23</sup>

The availability of new, sterile syringes varies across the country. Programs to reduce needle-sharing among injection drug users cannot





work without access to sterile injection equipment. Multiple trials have proven effective in reducing needle-sharing through increased access to sterile needles and syringes.<sup>24</sup>

In some communities, drug paraphernalia laws have been modified to exclude syringes, syringe prescription laws have been repealed, and pharmacy regulations and practice guidelines restricting the sale of sterile syringes without a prescription have been changed. Efforts to reduce HIV risk through these types of policy changes have been evaluated and found to be effective. For example, Connecticut reported significant reductions in the sharing of drug injection equipment after implementation of policies that increased access to sterile injection equipment through pharmacies and other outlets.<sup>25</sup>

Needle exchange programs, which exist in dozens of sites throughout the country, are also effective in preventing HIV transmission.<sup>26</sup> Following an extensive review of scientific evidence, the Department of Health and Human Services (HHS) concluded that needle exchange programs "can be an effective component of a comprehensive strategy to prevent HIV and other blood-borne infectious diseases in communities that choose to include them." A further review of research led HHS to determine that needle exchange programs do not encourage the use of illegal drugs.<sup>27</sup>

## WOMEN

Research has demonstrated that women—whose HIV infection rates have grown as the epidemic has evolved—also benefit from HIV prevention programs.

African-American women who participated in a five-session program focusing on such issues as personal responsibility, assertiveness in

sexual situations, and coping skills were significantly more likely to report consistent condom use.<sup>28</sup>

Similarly positive results were reported for participants in a program that used videos to promote group discussion about HIV-related issues. This program focused on assertiveness and on skills related to negotiation and planning for safer behaviors.<sup>29</sup>

Other research indicates that effective prevention programs for women tend to be "specifically directed toward women, focus on relationship and negotiation skills, and involve multiple, sustained contacts."<sup>30</sup>

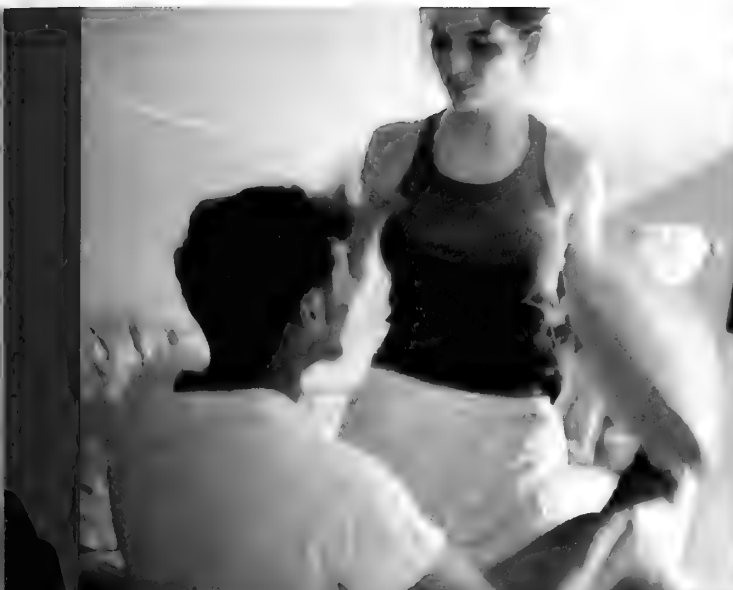
## HETEROSEXUAL ADULTS

In addition to the above-noted interventions for women, several other prevention programs have proven effective in helping heterosexual adults reduce their risky behavior.

Because untreated STDs greatly increase the risk of HIV transmission, many interventions for sexually active adults focus on STD clinics. For example, patients at an STD clinic who attended information sessions on condoms were significantly less likely to return to the clinic with an STD in the next 12 months.

According to the review of the prevention science literature in 1997, 22 interventions for heterosexual adults have demonstrated positive behavior change in participants. According to the review, heterosexual participants in HIV prevention programs typically increase their condom use 20-30%.<sup>32</sup>

In addition, studies have shown that treating other STDs can significantly reduce HIV transmission in some populations.<sup>33</sup>



# PREVENTION Strategies for ALL Populations

Other prevention strategies have proven effective across multiple populations and should complement behavioral intervention programs for each population at risk.

## COUNSELING AND TESTING

Of the estimated 800,000–900,000 people living with HIV in the United States, as many as one-third are HIV positive and don't know it. This has obvious individual and public health implications. Increasing the number of people who know their HIV status and linking them to prevention services and medical care are top CDC HIV prevention priorities.

According to research, HIV testing itself is an important prevention element. CDC researchers, for example, found that among the HIV-positive youth they studied, those who were aware of their infection were six times more likely to have safer sex than HIV-positive youth who did not know they were infected.<sup>34</sup>

For HIV-negative individuals, testing provides vital counseling opportunities to assist those who are engaging in high-risk behavior to reduce their risk, and an opportunity for referral to additional prevention services.

CDC supports research to improve educators' ability to capitalize on the testing experience to reduce risk behaviors. Studies have found that the

more the client actively participates in the counseling and testing experience, the more successful the sessions are. In 1998, researchers supported by CDC reported that clients who participated in interactive counseling sessions had 20% fewer STDs than clients exposed to mere informational counseling. In addition, adolescents who received interactive counseling had 40% fewer new STDs.<sup>35</sup>

New technology offers the opportunity to expand the benefits of counseling and testing. Conventional HIV testing methods take several days, and sometimes even weeks, to provide results, and a significant number of people who take the test never return for their results. Rapid testing, which enables many people to get their test results on the same day, even within minutes, has the potential to significantly increase the number of people who know their HIV status.

Rapid testing is not widely used because a second confirmatory test on all HIV-positive test results must be provided. The second confirmatory test must be conducted with a different type or brand of test. Since only one rapid test is currently approved for use in the United States, a second test must be a conventional test which takes several days to provide results. Therefore, confirmation cannot be provided in a single day. Approval of additional rapid tests will greatly enhance efforts to increase the number of people who are aware of their HIV status.



CDC research released in March 1998 estimated that nearly 700,000 more people a year, including over 50,000 infected individuals, would learn their true HIV status if rapid tests were used — a 29% increase in HIV-positive people and a 5% increase in HIV-negative people compared to conventional testing methods. Based on its research, CDC revised its recommendations on HIV testing to allow health care providers to provide patients the results of rapid tests before confirmatory test results are available in settings where they believe individuals can benefit.

## STD TREATMENT

Untreated sexually transmitted diseases (such as syphilis, gonorrhea, chlamydia, or herpes) enhance the infectivity of people with HIV and HIV-negative people's susceptibility to transmission of the virus. As the Institute of Medicine concluded in 1997, STD prevention and treatment should be viewed as essential components of HIV prevention.

While CDC provides funding for STD screening and treatment in public health clinics across the U.S., it is critical that both public and private efforts to properly diagnose and treat STDs be expanded and better coordinated with HIV prevention services.<sup>7</sup>

## TREATMENT FOR PREVENTING MOTHER-TO-CHILD TRANSMISSION

Evidence indicating that timely antiviral therapy substantially reduces the risk that a mother will transmit HIV to her newborn prompted CDC to formulate guidelines for voluntary HIV testing and counseling in prenatal settings. These guidelines have been widely implemented, and have succeeded in greatly reducing mother-to-child transmission.<sup>35</sup>

Between 1992 and 1998, the number of U.S. infants who acquired AIDS from mother-to-child transmission declined by 75% — in 1998, only 224 U.S. infants developed AIDS as a result of HIV infection from their mothers. Over 60% of these cases were among African Americans.

By continuing to expand HIV prevention efforts for African-American women, and by working to ensure access to early prenatal care for all women, CDC believes perinatal HIV transmission can be reduced even further.

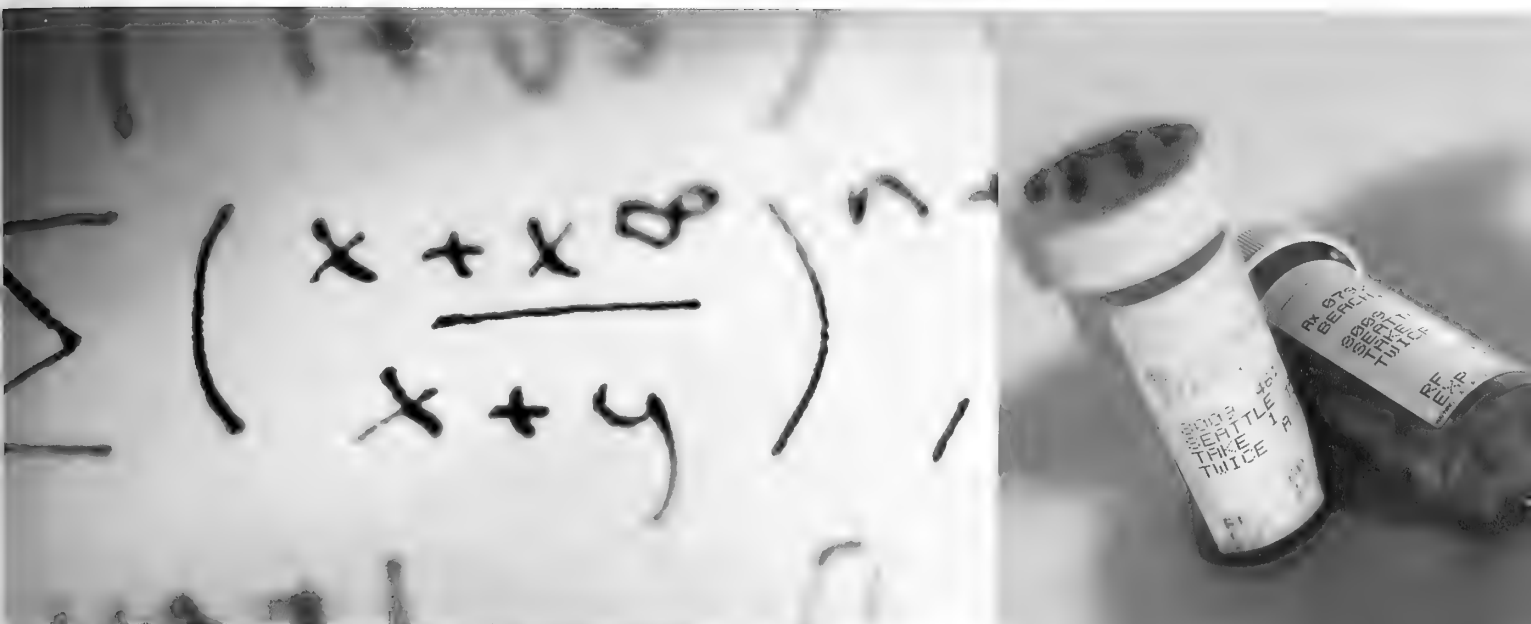
## MONITORING NEW INFECTIONS

CDC has conducted HIV seroprevalence surveys in limited populations since 1988. These surveys have long helped experts understand the *overall prevalence* of HIV in particular populations — that is, the number of people who are HIV positive. The inability to distinguish recent infections from old ones, however, has prevented a better understanding of HIV *incidence* — the number of people who are becoming newly infected.

Limited understanding of the most immediate HIV infection trends makes it difficult to determine with confidence how to best deploy prevention resources to address those most at risk. The epidemic is constantly evolving, and the epidemic this year may be markedly different from how it looked two years ago.

Fortunately, a new technology developed by CDC has greatly enhanced our ability to characterize the epidemic's "cutting edge," and to ensure prevention programs are directed to those most in need. Known as STARHS (Serologic Testing Algorithm for determining Recent HIV Seroconversion), the approach tests blood with two separate antibody tests, each with different sensitivities to the virus. Blood that tests positive on one test but negative on the other reflects HIV infection within the previous four to six months.

The STARHS technology, combined with current surveillance systems, will enable CDC and state and local health officials to obtain a clearer, more timely picture of who is at greatest risk. This, in turn, will improve the strategic capacity of states and localities to target prevention resources to those who need them the most.



# Identifying and Expanding NEW HIV Prevention Strategies

While we know more than ever before about how to prevent HIV transmission, new strategies in several areas are critically needed.

## EFFECTIVELY LINKING HIV TREATMENT AND PREVENTION

Combination antiviral therapy—made possible in the mid-1990s by the emergence of protease inhibitors—has helped slash rates of AIDS-related death and illness. Federal treatment guidelines, adopted in 1998, recommend that doctors consider initiating combination therapy at any point after a patient contracts HIV infection.

One of the principal results of combination therapy is a dramatic reduction in the amount of virus in the body (commonly known as viral load). By reducing viral load—especially in large numbers of people—combination therapy could theoretically slow the rate at which HIV is transmitted. A recent study of heterosexuals in Uganda showed that there had been no transmission of the virus among those whose viral load was low. However, these people had kept their virus levels low with their immune systems only, not with anti-retroviral therapy, and it is not yet known if people on combination therapy have the same level of reduced transmission.<sup>39</sup> Additionally, the risk of transmission is unlikely to be consistently reduced to zero. Cases of perinatal transmission have been documented in the U.S. from women who had undetectable viral loads.<sup>40</sup>

From a prevention standpoint, combination therapy poses challenges for preventing the spread of HIV, as well as potential benefits. Studies indicate that resistance may develop to the new drugs, especially among patients who either have previously been exposed to one or more antiviral drugs, or fail to adhere to the recommended complex regimens. Not only does resistance permit the virus to rebound, but it presents the risk of transmission of drug-resistant virus to others.

In addition, there is evidence that some people may be increasing their level of risk behavior out of an erroneous belief that safer behavior is no longer necessary.<sup>41</sup> Some people may believe that individuals are not infectious while on therapy. While combination antiretroviral therapy likely reduces risk, it by no means eliminates the risk of transmission. An overall rise in risk behavior could erase—or even reverse—the potential prevention benefits of combination therapy.

To reap the potential prevention benefits of combination therapy—and to avoid the possible negative effects on risk behavior—it is essential to pursue several public health priorities:

- First, because individuals who do not know they are infected cannot take advantage of combination therapy, and may not be taking steps to prevent transmission to others, we must increase the number of infected individuals who know their serostatus. In response to this



problem, CDC has undertaken several new initiatives—including an active national partnership and a multi-media campaign targeted to high-risk populations, especially young people and communities of color. The campaign seeks to encourage higher testing rates by increasing awareness of the benefits of HIV testing and reducing HIV-related stigma.

- Second, we must intensify efforts to provide access to, and utilization of, HIV-related medical care for those infected. Currently, CDC, the Health Resources and Services Administration (HRSA), and other organizations of the Department of Health and Human Services (HHS) are actively exploring strategies to expand health care access and to link HIV-related care and prevention services. It is critical to ensure that services extend beyond medical treatment and provide HIV-infected individuals increased and sustained access to HIV prevention programs to help them maintain safer behaviors over a lifetime. These services must include access to substance abuse treatment and mental health services when needed.
- Third, we must learn more about impediments to treatment adherence and develop better strategies to enhance the ability of patients to adhere to the exacting regimens recommended for the treatment of HIV. Both CDC and the National Institutes of Health (NIH) are actively engaged in adherence-related research.

### **FEMALE-CONTROLLED PREVENTION**

Many women have become infected with HIV through heterosexual sex with partners whom they did not know were at risk for HIV. Because women may not be able to readily determine the risk factors of sexual partners, women should protect themselves in every sexual encounter. It is therefore critical to develop an intervention that is under a woman's control. Even when women are aware of or concerned about risk, they may not be able to effectively negotiate the use of male condoms. Further, in some situations, insisting on condom use can place women at risk of physical and emotional abuse.

Responding to the need to develop new, effective prevention tools women can control, CDC researchers are working with scientists worldwide to evaluate the efficacy of female condoms and to develop effective topical microbicides that can kill HIV and the pathogens that cause other STDs. This work includes collaborative trials of microbicide-containing gels, as well as basic research on vaginal secretions and other factors, such as contraceptive use, that may influence transmission.

As with any new tool for prevention, scientists must also determine what influences people's willingness and ability to use these methods. CDC behavioral scientists are simultaneously working to evaluate the factors that will contribute to women's use of female condoms and microbicides and how these new prevention methods can and should be balanced with existing prevention options.

### **VACCINES**

Ultimately, a preventive vaccine is the best hope for ending the spread of HIV/AIDS—especially in developing countries, where 95% of all new infections occur. As has been the case with other infectious diseases, CDC is integrally involved in the search for an effective HIV vaccine. CDC researchers are assisting in the evaluation of potential candidate vaccines, as well as studying the impact of ongoing vaccine trials on the behaviors of individuals and communities involved. CDC is actively involved in ensuring that people in the trials, and in the surrounding communities, do not falsely assume that the trials negate the need for prevention and that individuals maintain safer behavior to protect themselves from infection.

# How do we **FURTHER REDUCE** the number of **NEW** infections?

CDC estimates that the level of new infections (about 40,000 each year) has remained relatively stable since 1992. While increases have been prevented, the level of new infections has not declined substantially over the past decade. With so much knowledge about effective HIV prevention strategies, some have asked why America has not made more progress in further reducing the number of new infections.

Early prevention strategies principally focused on white gay men and male injection drug users—the two groups hardest hit in the 1980s, when prevention funding steadily increased. During the 1990s, the epidemic underwent many important changes:

- Whereas men accounted for 90% or more of infections in the 1980s, an estimated 30% of all new infections today are among women.
- Heterosexual intercourse, the source of only a tiny fraction of infections in the 1980s, now accounts for three out of four new infections among women and one-third of all new infections.
- Powerful new drugs have prolonged lives, meaning that prevention programs must expand their focus on people living with HIV.
- A generation of gay men who benefited from HIV prevention efforts has been replaced by a generation of younger men who need prevention services.
- In contrast to the epidemic's first decade, whites now account for a minority of new infections. At present, more than half of all new infections are among African Americans and 20% are among Latinos.
- People becoming infected with HIV today are younger than ever before. One out of two new infections strikes young people under the age of 25, and one in four occurs in people 21 years or younger.
- While HIV hit many middle-class people in the 1980s, infections today are more likely to occur in people who are poor, with limited access to health care.
- A disease of the urban inner cities in the 1980s, HIV/AIDS has also spread to the suburbs, smaller cities, and rural areas—many of which lack the public health and community-based infrastructure of larger metropolitan areas.

These epidemiologic changes have presented significant new challenges, necessitating the development of entirely new prevention strategies and the active engagement of additional communities in the national fight against the disease. Increasingly, HIV prevention is forced to confront difficult social problems such as poverty, racism, homelessness, and inner-city violence. Although gay white men and injection drug users have clearly benefited from early prevention programs, they remain at significant risk of HIV infection and require continued exposure to HIV

prevention programs. Prevention programs must also continually be updated to reflect and incorporate advances in science and knowledge.

In response to multiplying needs, CDC continuously shifts funding toward new priorities. As the epidemic increasingly affected African-American communities, for example, CDC increased its funding specifically earmarked for African Americans from \$11 million in 1988 to nearly \$140 million in 1999. Similarly, funding directed toward Latinos increased from approximately \$7 million in 1988 to \$59 million in 1999 to reflect their growing proportion of the HIV/AIDS epidemic.

Additionally, a significant proportion of CDC's research and surveillance programs serve African Americans and Latinos at risk, as do programs not targeted by race. Overall, of nearly \$615 million dollars CDC currently spends on HIV prevention efforts for high-risk or emerging populations, roughly 41%, or an estimated \$251 million, benefits African Americans. Roughly 18%, or an estimated \$113 million, benefits Latinos.

Yet, overall funding for HIV prevention has not kept pace with the expanding need—the growing range of HIV prevention priorities—nor with the growing complexity of HIV prevention efforts. Between 1991 and 1999, federal funding for HIV prevention programs at CDC grew by about 3% a year, barely keeping pace with the rate of inflation. By 1999, prevention accounted for merely 8% of federal AIDS spending.

The combination of limited growth of funding and an increasingly complex epidemic has meant that CDC (and the state and local health departments, community-based organizations, and national and regional minority organizations it funds) must do more with less. This has resulted in a triage approach to public health (i.e., only the highest priorities are addressed). Not enough funding exists to adequately address the full range of HIV prevention needs, leaving important prevention needs unmet.

Revealingly, the nation's progress in reducing the annual number of new infections—which began in the 1980s and coincided with substantial increases in HIV prevention funding—slowed as prevention funding plateaued in the early 1990s. Between 1992 and 1999 as real funding for prevention flattened, the rate of new infections stabilized at an annual rate of 40,000.

# A United States PREVENTION AGENDA

Working with a wide array of experts and prevention centers, CDC has developed an HIV prevention agenda to meet today's urgent prevention priorities and is working to cut new infections in half over the next several years.

This can be achieved, but only with adequate resources. A renewed commitment to HIV prevention must occur on multiple levels, and both private- and public-sector programs and resources must be brought to bear.

By focusing on proven HIV prevention programs and substantially increasing efforts to reach and provide services to HIV-infected individuals, the U.S. epidemic can be stopped. Researchers have concluded that with existing knowledge, sustained prevention for populations currently at risk, and adequate resources to reach infected individuals (including those currently unaware of their infection) with testing, prevention services, and care, U.S. infections could be significantly reduced in five years.

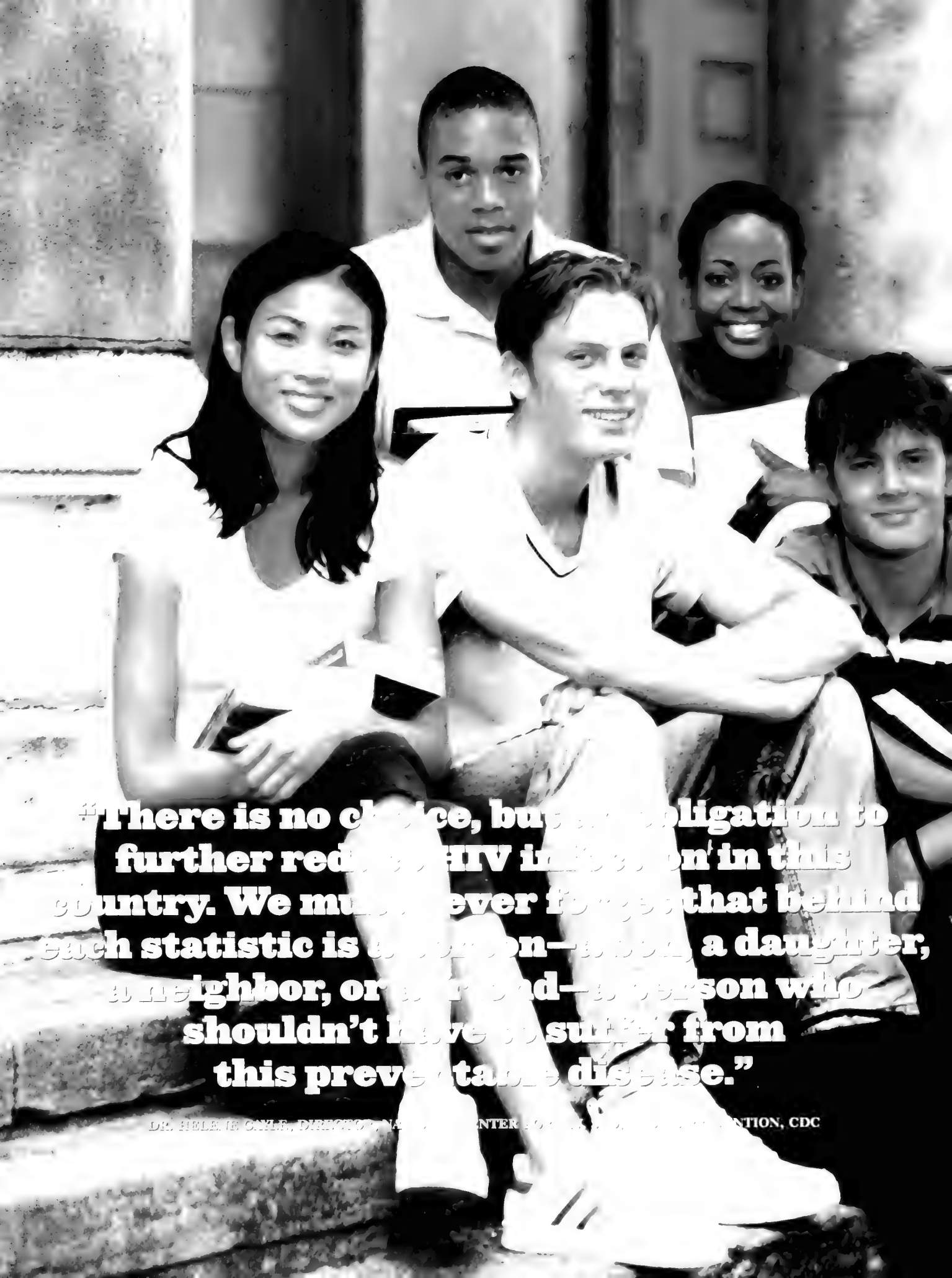
Researchers estimate that the discounted cost of lifetime treatment for a person with HIV now averages about \$155,000. With 40,000 people infected yearly, America faces an additional annualized cost of more than \$6 billion each and every year.

Scientists have estimated that providing access to community-level HIV prevention or small-group interventions to all those at risk for sexual transmission of HIV in the United States would cost upwards of \$1 billion annually. Providing prevention services to all those at risk from injection drug-related HIV infection in the U.S. would cost an estimated \$423 million annually. Clearly, investing in prevention will save dollars, in addition to lives.<sup>42</sup>



**"Let's put into the dustbin the  
idea that simplistic solutions  
will end this epidemic...  
We need an expanded response.  
There is good evidence that  
prevention works.  
There's no excuse for  
governments not to invest  
in prevention."**

DR. PETER PIOT, EXECUTIVE DIRECTOR,  
UNITED NATIONS AIDS PROGRAM



**"There is no choice, but an obligation to further reduce HIV infection in this country. We must never forget that behind each statistic is a woman—a son, a daughter, a neighbor, or a friend—a person who shouldn't have to suffer from this preventable disease."**

DR. HELEN I. CHALK, DIRECTOR, NATIONAL CENTER FOR HIV/AIDS PREVENTION, CDC

# Meeting the CHALLENGE



Were it not for an aggressive national HIV prevention program, countless additional Americans would today be battling HIV/AIDS and many more would have died.

Yet this important measure of success hardly suffices. Forty thousand new HIV infections each year are neither acceptable nor inevitable. Significant reductions in HIV infection are possible, with an expanded commitment to prevention.

Unfortunately, increases in new infections are also possible. Level funding likely will not equate to a stable HIV epidemic much longer, as more people with HIV are living longer, healthier, and more sexually active lives.

AIDS remains the leading cause of death among African-American men and women combined, ages 25 to 44, and the virus makes deeper inroads each year into communities of color throughout the country. As infection rates remain unacceptably high among teenagers and young adults, the disease threatens yet another generation.

In the fight to conquer AIDS, we stand at a critical crossroads. Either the nation will move beyond complacency to take advantage of proven strategies and new prevention tools, or we will witness an escalation in new infections and the potential spread of drug-resistant virus.

Public health demands that we re-invest in a re-energized, science-driven effort to reduce the spread of HIV—as does our national conscience.

# REFERENCES

1. N.A. Hessel, A.R. Lifson, P.M. O'Malley, L.S. Doll, H.W. Jaffe, G.W. Rutherford. Prevalence, Incidence and Progression of Human Immunodeficiency Virus Infection in Homosexual and Bisexual Men in Hepatitis B Vaccine Trials, 1978-1988. *Am J Epidemiol*. 1989;130(6):11.
2. M. Becker & J. Joseph. AIDS and Behavioral Change to Reduce Risk: A Review. *Am J Public Health*. 1988;78:394-410.
3. M. Morris & L. Dean. Effect of Sexual Behavior Change on Long-Term Human Immunodeficiency Virus Prevalence Among Homosexual Men. *Am J Epidemiol*. 1994;140:217-232.
4. J. Stryker, T.J. Coates, P. DeCarlo et al. Prevention of HIV Infection: Looking Back, Looking Ahead. *JAMA*. 1995;273:1143-1148.
5. R.J. Battjes, R.W. Pickens, L.S. Brown. HIV Infection and AIDS Risk Behaviors Among Injecting Drug Users Entering Methadone Maintenance: An Update. *J Acquir Immune Defic Syndr Hum Retroviral*. 1995;10:90-96.
6. D.S. Metzger, H. Navaline, G.E. Woody. Drug Abuse Treatment as AIDS Prevention. *Public Health Reports*. 1998;Suppl. 1:97-106.
7. D.C. Des Jarlais, T. Perlis, S.R. Friedman et al. Declining Seroprevalence in a Very Large HIV Epidemic: Injecting Drug Users in New York City, 1991 to 1996. *Am J Public Health*. 1998;88:1801-1806.
8. J. Rotham & M. Tesoriero. Implementing HIV Prevention Programs in Substance Abuse Treatment Facilities as Part of a Comprehensive HIV Service Model—Eight-Year Retrospective. National HIV Prevention Conference, Abstract No. 325. 1999.
9. S.R.J. DiClemente & G.M. Wingood. Randomized Controlled Trial in an HIV Sexual Risk-Reduction Intervention for Young African-American Women. *JAMA*. 1995;274:1271-1276.
10. S.N. El-Bassel & R.E. Schilling. 15-Month Follow-Up of Women Methadone Patients Taught Skills to Reduce Heterosexual HIV Transmission. *Public Health Reports*. 1992;107:500-504.
11. J.B. Jemmott, L.S. Jemmott, G.I. Fong. Reductions in HIV Risk-Associated Sexual Behaviors Among Black Male Adolescents: Effects of an AIDS Prevention Initiative. *Am J Public Health*. 1992;83:372-377.
12. D. Cohen, C. Dent, D. MacKinnon. Condom Skills Education and Sexually Transmitted Disease Remediation. *J Sex Research*. 1991;28:139-144.
13. M.E. Kamb, M. Fishbein, J.M. Douglas et al. Efficacy of Risk-Reduction Counseling to Prevent Human Immunodeficiency Virus and Sexually Transmitted Disease: A Randomized Controlled Trial. *JAMA*. 1998;280:1161-1167.
14. J.B. Jemmott, L.S. Jemmott, G.I. Fong. Reductions in HIV Risk-Associated Sexual Behaviors Among Black Male Adolescents: Effects of an AIDS Prevention Initiative. *Am J Public Health*. 1992;83:372-377.
15. M. Rotheram-Borus. Interventions to Reduce Heterosexual Transmission of HIV. *Interventions to Prevent HIV Risk Behaviors: Programs & Abstracts*. National Institutes of Health, Consensus Development Conference, 1997.
16. M. Rotheram-Borus, M.B. Lee, D.A. Murphy. Evaluation of a Behavior Intervention to Seropositive Youth. National HIV Prevention Conference, Abstract No. 384. 1999.
17. R.O. Valdeserri, D.W. Lyster, L.C. Leviton et al. AIDS Prevention in Homosexual and Bisexual Men: Results of a Randomized Trial Evaluating Two Risk-Reduction Interventions. *AIDS*. 1989;3:21-26.
18. J.A. Kelly, J.S. St. Lawrence, Y. Stevenson et al. Community AIDS/HIV Risk Reduction: The Effects of Endorsement by Popular People in Three Cities. *Am J Public Health*. 1992;82:1485-1489.
19. J.L. Peterson, T.J. Coates, J. Catania et al. Evaluation of an HIV Risk Reduction Intervention Among African-American Homosexual and Bisexual Men. *AIDS*. 1996;10:519-525.
20. S.M. Kegeles, R.B. Hays, T.J. Coates. The Empowerment Project: A Community-Level HIV Prevention Intervention for Young Gay Men. *Am J Public Health*. 1996;86:1129-1136.
21. D.S. Metzger, H. Navaline, G.E. Woody. Drug Abuse Treatment as AIDS Prevention. *Public Health Reports*. 1998;113(Suppl. 1):97-106.
22. H.A. Stiegel, R.S. Elick, R.G. Carlson et al. Reducing HIV Needle Risk Behaviors Among Injection Drug Users in the Midwest: An Evaluation of the Efficacy of Standard and Enhanced Interventions. *AIDS Ed Prev*. 1995;7:508-509.
23. N. El-Bassel & R.E. Schilling. 15-Month Follow-Up of Women Methadone Patients Taught Skills to Reduce Heterosexual HIV Transmission. *Public Health Reports*. 1992;107:500-504.
24. J. McCusker, X.M. Stockdale, J.G. Zapka et al. AIDS Education for Drug Abusers: Evaluation of Short-Term Effectiveness. *Am J Public Health*. 1992;82:533-539.
25. R.H. Needle & S. Cook. Community-Based Outreach Risk-Reduction Strategies to Prevent HIV Risk Behaviors in Out-of-Treatment Injection Drug Users. *Interventions to Prevent HIV Risk Behaviors: Programs & Abstracts*. National Institutes of Health, Consensus Development Conference, 1997.
26. AIDS Community Demonstration Project-Research Group. Community-Level HIV Intervention in Five Cities: Final Outcome Data from the One AIDS Community Demonstration Projects. *Am J Public Health*. 1999;89:336-343.
27. T.S. Jones, D. Mahow. Use of Sterile Syringes and Aseptic Drug Preparation: an Important Component of HIV Prevention Among Injection Drug Users. *J Acquir Immune Defic Syndr Hum Retroviral*. 1998;15(Suppl. 1):S1-5.
28. T.A. Valleron, B. Weinstein, T.S. Jones et al. Impact of Increased Legal Access to Needles and Syringes on Community Pharmacies' Needle and Syringe Sales—Connecticut, 1992-1993. *J Acquir Immune Defic Syndr Hum Retroviral*. 1995;10:73-81.
29. D.C. Des Jarlais, M. Marmor, D. Donnell et al. HIV Incidence Among Injecting Drug Users in New York City: Syringe-Exchange Programmes. *Lancet*. 1996;348:587-591.
30. HIV Consensus Development Conference. Intervention to Prevent HIV Risk Behaviors. Bethesda, MD, February 11-13, 1997.
31. J. Normand, D. Mahow, T.E. Moore, eds. Preventing HIV Transmission: The Role of Sterile Needles and Bleach. Washington, D.C.: National Academy Press, 1995.
32. Press Release from Surgeon General. Evidence-Based Findings on the Efficacy of Syringe Exchange Program: An Analysis from the Assistant Secretary for Health and Surgeon General of the Scientific Research Completed Since April 1998.
33. R.J. DiClemente & G.M. Wingood. Randomized Controlled Trial in an HIV Sexual Risk-Reduction Intervention for Young African-American Women. *JAMA*. 1995;274:1271-1276.
34. S.T. Hobfoll, A.P. Jackson, J. Lavin et al. Reducing Inner-City Women's AIDS Risk Activities: A Study of Single, Pregnant Women. *Health Psychology*. 1994;13:597-605.
35. A.A. Ehrhardt. Behavioral Interventions with Women. *Interventions to Prevent HIV Risk Behaviors: Programs & Abstracts*. National Institutes of Health, Consensus Development Conference, 1997.
36. D. Cohen, C. Dent, D. MacKinnon. Condom Skills Education and Sexually Transmitted Disease Remediation. *J Sex Research*. 1991;28:139-144.
37. M. Rotheram-Borus. Interventions to Reduce Heterosexual Transmission of HIV. *Interventions to Prevent HIV Risk Behaviors: Programs & Abstracts*. National Institutes of Health, Consensus Development Conference, 1997.
38. D.F. Fleming, J.N. Wasserheit. From Epidemiological Strategy to Public Health Policy and Practice: The Contribution of Other Sexually Transmitted Diseases to Heterosexual Transmission of HIV Infection. *Sex Transm Infect*. 1999;73(1):5-17.
39. P.H. Denning, A.K. Nakashima, P. Wortley et al. High-Risk Sexual Behaviors Among HIV-Infected Adolescents and Young Adults. National HIV Prevention Conference, Abstract No. 113. 1999.
40. M.E. Kamb, M. Fishbein, J.M. Douglas et al. Efficacy of Risk-Reduction Counseling to Prevent Human Immunodeficiency Virus and Sexually Transmitted Disease: A Randomized Controlled Trial. *JAMA*. 1998;280:1161-1167.
41. Institute of Medicine, National Academy of Sciences. *The Hidden Epidemic: Confronting Sexually Transmitted Diseases*. 1997.
42. R. Rothenberg et al. The Effect of Treating Sexually Transmitted Diseases on the Transmission of HIV in Dually Infected Persons. *Sex Transm Diseases*. 2000;27:411-416.
43. United States Recommendation of the Advisory Committee for HIV and STD Prevention. HIV Prevention Through Early Detection and Treatment of Other Sexually Transmitted Diseases. July 31. 1998;47:RR12c:1-24.
44. M.E. Finkelstein, R.H. Myers, P. Thomas et al. Trends in Perinatal Transmission of HIV/AIDS in the United States. *JAMA*. 1999;282:1142-1149.
45. G. Mehan, K. Corson, H. Malamud et al. Success in Implementing Public Health Service Guidelines to Reduce Perinatal Transmission of HIV—Louisiana, Michigan, New Jersey and South Carolina. *Morbidity & Mortality Weekly Report*. 1995;47:688-691.
46. T.C. Quinn, M.J. Wawer, N. Sewankambo, D. Serwadda, C. Li, T. Wabwayi, M. Meehan, T. Lutalo, R.H. Gray. Viral Load and Heterosexual Transmission of Human Immunodeficiency Virus Type 1. *New England Journal of Medicine*. Volume 342, 13:921, March 30, 2000.
47. R. Spurling et al. Maternal Viral Load, Zidovudine Treatment, and the Risk of Transmission of Human Immunodeficiency Virus Type 1 from Mother to Infant. *New England Journal of Medicine*. Volume 335(22):1621-29, November 28, 1996.
48. O. Coll et al. Vertical HIV-1 Transmission Correlates with a High Maternal Viral Load at Delivery. *J Acquir Immune Defic Syndr Hum Retroviral*. 1997;14:26-30.
49. M. Mayaux et al. Maternal Virus Load During Pregnancy and Mother-to-Child Transmission of Human Immunodeficiency Virus Type 1: The French Prenatal Cohort Study. *J Infectious Diseases*. 1997;175:172-5.
50. D. Burns et al. Influence of Other Maternal Variables on the Relationship Between Maternal Virus Load and Mother-to-Infant Transmission of Human Immunodeficiency Virus Type 1. *J Infectious Diseases*. 1997;175:1206-10.
51. J.A. Kelly, R.G. Hoffman, D. Rompa et al. Protease Inhibitor Combination Therapies and Perceptions of Gay Men Regarding Virus Severity and the Need to Maintain Safer Sex. *AIDS*. 1998;12:191-195.
52. J.S. Lehman, F.M. Hecht, P. Wortley, A. Lansky. Are At-Risk Populations Less Concerned about HIV Infection in the United States? Atlanta, GA and Univ. of California, San Francisco. Abstract No. 198. 7th Conference on Retroviruses and Opportunistic Infections, Jan 30-Feb 2, 2000.
53. S. Kivrok, G. Victor, S. Houston et al. Effect of Antiretroviral Therapy and Viral Load on the Perceived Risk of HIV Transmission and the Need for Safer Sexual Practices. *J Acquir Immune Defic Syndr Hum Retroviral*. 1998;19:124-129.
54. D. Holtgrave, M. Merson, J. Dayton, S. Pinkerton, J. Anderson. Estimating the National Cost of Implementing State-of-the-Art HIV Prevention Services for Persons at Behavioral Risk of Infection or Transmission. cpc, Atlanta, GA, Yale University School of Medicine, New Haven, CT, Center for AIDS Intervention Research, Milwaukee, WI. Abstract No. 11bPc5434, 13th International AIDS Conference, July 9-14, 2000.



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